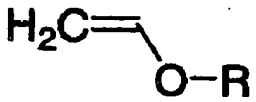
Replaced by Art. 19

CLAIMS

1. A fluorine-containing vinyl ether represented by the formula 1,



(1)

wherein R represents an organic group comprising at least one fluorine atom and a cyclic structure.

2. A fluorine-containing vinyl ether according to claim 1, wherein the organic group comprises:

(a) the cyclic structure that is selected from the group consisting of cyclopentane ring, cyclohexane ring, norbornene ring, aromatic rings, tricyclodecane ring; and

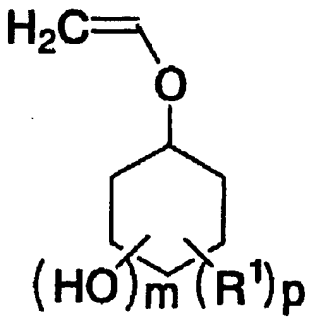
(b) at least one substituent that is selected from the group consisting of $(\text{-OH})_m$, $(\text{-R}^1)_n$, and -COOR^4

where R^1 is at least one substituent selected from the group consisting of –F, $-CF_3$, and $-R^2C(CF_3)_2OR^3$, where R^2 is CH_2 or C_2H_4, and R^3 is H or an acid-labile protecting group,

R^4 is H, a C_1-C_{15} alkyl group, or a C_1-C_{15} substituent containing an ether bond, and

m is 0 or 1, and n is an integer of 1-8.

3. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by the formula 2,

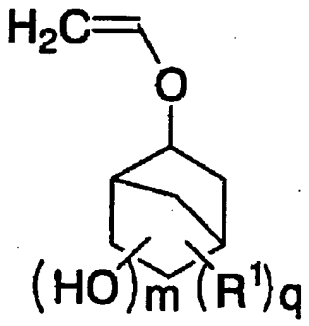


(2)

where R^1 is at least one substituent selected from the group consisting of –F, $-CF_3$, and $-R^2C(CF_3)_2OR^3$, where R^2 is CH_2 or C_2H_4, and R^3 is H or an acid-labile protecting group, and

p is an integer of 1-5, and m is 0 or 1.

4. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by the formula 3,

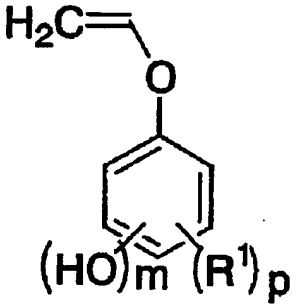


(3)

where R^1 is at least one substituent selected from the group consisting of –F, $-CF_3$, and $-R^2C(CF_3)_2OR^3$, where R^2 is CH_2 or C_2H_4, and R^3 is H or an acid-labile protecting group, and

q is an integer of 1-4, and m is 0 or 1.

5. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by the formula 4,

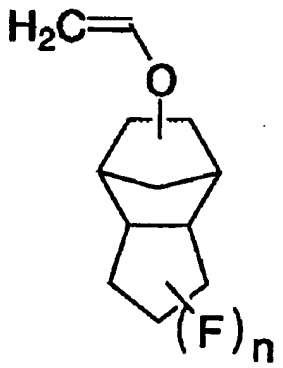


(4)

where R^1 is at least one substituent selected from the group consisting of –F, $-CF_3$, and $-R^2C(CF_3)_2OR^3$, where R^2 is CH_2 or C_2H_4, and R^3 is H or an acid-labile protecting group, and

p is an integer of 1-5, and m is 0 or 1.

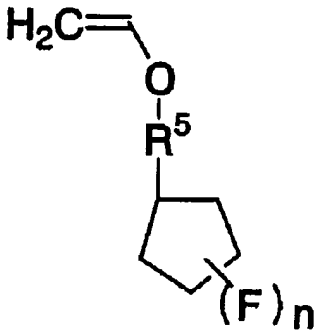
6. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by the formula 5,



(5)

where n is an integer of 1-8.

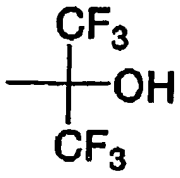
7. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by the formula 6,



(6)

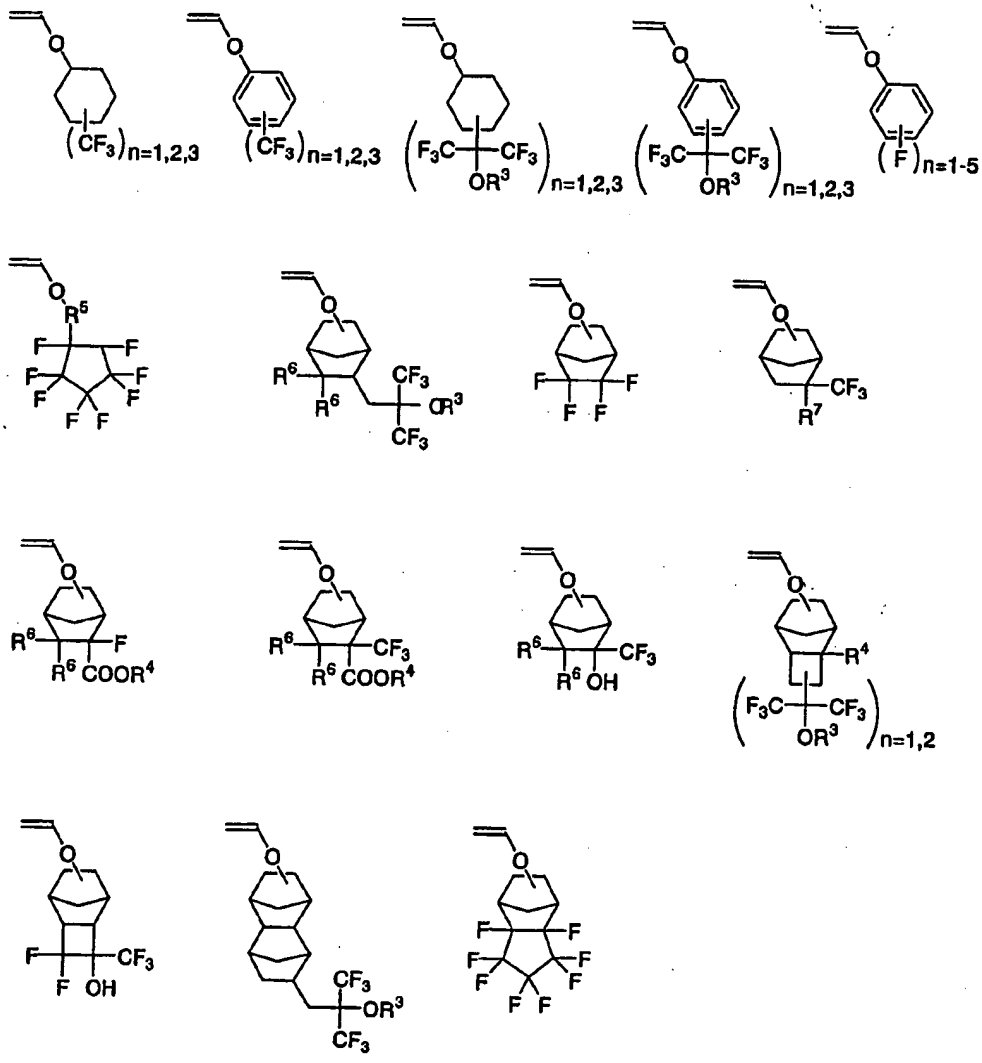
where R^5 is a C_0-C_5 alkyl group, and n is an integer of 1-8.

8. A fluorine-containing vinyl ether according to claim 1 or 2, which comprises a hexafluoroisopropanol unit represented by the formula 7,



(7).

9. A fluorine-containing vinyl ether according to claim 1 or 2, which is represented by one of the following formulas:



where R^3 is H or an acid-labile protecting group;

R^4 is H, a C_1-C_{15} alkyl group, or a C_1-C_{15} substituent having an ether bond;

R^5 is a C_0-C_5 alkyl group;

R^6 is H or F; and

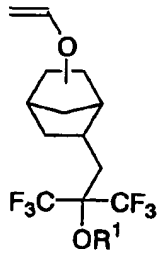
R^7 is CF_3, OH, CO_2H, CO_2R^8, or $OCOR^8$ where R^8 is C_1-C_{15} alkyl group.

10. A fluorine-containing polymer comprising a unit derived from a fluorine-containing vinyl ether according to claim 1 or 2.

11. A resist composition comprising a fluorine-containing polymer according to claim 10.

12. A fluorine-containing copolymer comprising:

a first unit derived from a first monomer that is a fluorine-containing vinyl ether represented by the formula 8:



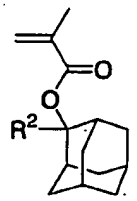
(8)

where R^1 is –H or a C_1-C_8 alkyl group that optionally contains an oxygen atom; and

a second unit derived from a second monomer that is at least one selected from the group consisting of acrylic esters and methacrylic esters.

13. A fluorine-containing copolymer according to claim 12, wherein the second monomer contains an acid-labile protecting group.

14. A fluorine-containing copolymer according to claim 12 or 13, wherein the second monomer is a first methacrylic ester represented by the general formula 9:

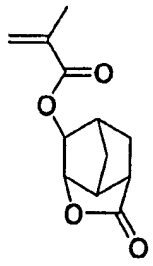


(9)

where R^2 is $-CH_3$ or $-CH_2CH_3$.

15. A fluorine-containing copolymer according to claim 12, wherein the second monomer is an acrylic or methacrylic ester comprising a lactone ring.

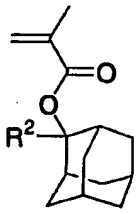
16. A fluorine-containing copolymer according to claim 12 or 15, wherein the second monomer is a second methacrylic ester represented by the formula 10:



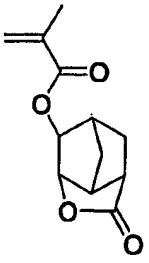
(10)

17. A fluorine-containing copolymer according to claim 12, wherein the second monomer is a combination of first and second methacrylic esters represented by the formulas 9 and 10, and

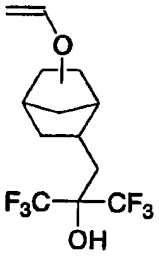
wherein the fluorine-containing vinyl ether is represented by the formula 11,



(9)



(10)



(11)

where R^2 is $-CH_3$ or $-CH_2CH_3$.

18. A resist composition comprising a fluorine-containing copolymer according to claim 12 or 13.